Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte SUSAN SEBATA and LENNY LOW

Appeal No. 2005-0695
Application No. 10/007,256

ON BRIEF

Before FRANKFORT, MCQUADE and BAHR, Administrative Patent Judges.

BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-3, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

The appellants' invention relates to a two-sided deployable thermal radiator system and method for use on spacecraft. Claim 1 is representative of the invention and is reproduced in the opinion section of this decision.

The Prior Art

The examiner relied upon the following prior art references in rejecting the appealed claims:

Nakamura et al. (Nakamura)	4,880,050	Nov. 14, 1989
Aston et al. (Aston)	5,755,406	May 26, 1998
Drolen et al. (Drolen)	5,787,969	Aug. 4, 1998

The Rejection

Claims 1-3 stand rejected under 35 U.S.C. § 103 as being unpatentable over Drolen in view of Aston and Nakamura.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejection, we make reference to the final rejection and answer (Paper Nos. 6 and 11) for the examiner's complete reasoning in support of the rejection and to the brief (Paper No. 10) for the appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims[1], to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. For the following reasons, we cannot sustain the examiner's rejection.

Claim 1 reads as follows:

> 1. A spacecraft radiator system for use on a spacecraft having a body and one or more solar arrays, the system comprising:
>
> first and second opposite facing payload radiators;
>
> one or more deployable radiators that radiate heat from both sides thereof; and
>
> heat pipes that thermally couple each payload radiator to the one or more deployable radiators disposed on a side of the spacecraft that is opposite to the respective payload radiator.

Claim 2 is directed to a spacecraft comprising a radiator system as recited in claim 1 and claim 3 is directed to a spacecraft heat dissipation method including the step of launching a spacecraft equipped with a radiator system as recited in claim 1 into orbit and, when in orbit, transferring heat coupled to the opposite facing payload radiators to the deployable radiators disposed on the opposite side of the spacecraft for radiation into space.

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[1] It appears that the end of claim 3 is intended to read "from both sides of the deployable radiators."

Drolen discloses a payload structure 10 for a communication satellite having fixed radiator panels 16, 18 on opposite sides thereof, heat pipes 20 that carry heat from equipment modules to the radiator panels 16, 18 and deployable radiators 12, 14 located on opposite sides of the satellite. Flex coils 22 are provided with one end fastened to a fixed radiator panel and the other end fastened to a deployable radiator, the fixed radiator and deployable radiator being located on the same side of the satellite, as illustrated in Figure 1. With the deployable radiators in the stowed position, the flex coils 22 are somewhat compressed. After launch, a deployable radiator is deployed by opening launch locks and the flex coils 22 attached to the fixed radiator and the deployed radiator will decompress, such that the coils are no longer concentric and heat energy is transferred from the heat source modules to the fixed radiator panel and to the deployed radiator, whereby the heat may be rejected from the spacecraft.

Drolen lacks solar panels and heat pipes thermally coupling one or more of the fixed payload radiators to a deployable radiator disposed on the side of the spacecraft that is **opposite** to the respective payload radiator, as called for in each of appellants' claims 1-3. As for the solar panels, the examiner points out that Aston evidences that the use of solar panels on communication spacecraft was well known in the art at the time of appellants' invention and asserts that it therefore would have been obvious to

provide solar panels on Drolen's communication satellite to help generate power and appellants do not challenge this assertion.

The examiner relies on Nakamura for a suggestion to thermally couple the fixed radiator panels to a deployable radiator on the opposite side of Drolen's satellite. As more fully explained below, we find no such suggestion in Nakamura.

Nakamura discloses a thermal management system for a space vehicle comprising a heat pipe system which selectively thermally couples each heat generating panel to either an adjacent external radiator panel disposed on the same side of the vehicle or external radiator panels disposed on the opposite side of the vehicle, depending on the orientation of the vehicle. For example, when radiator panel 114a is directed away from the sun, heat generated by electronic equipment 120a is transferred to radiator panel 114a via mounting panel 116a and external heat pipes 122a. When radiator panel 114a faces the sun, however, radiator panel 114a is deactivated by expanding a control gas into first legs 222a of external heat pipes 122a and heat flows as shown by the arrows in Figure 2 to radiator panels on the opposite side of the vehicle (paragraph bridging columns 3 and 4). According to Nakamura, this operation of the heat pipe system will tend to disperse heat from the inactive pallet facing the sun to all other operable radiators at all orbital orientations (column 4, lines 44-49).

Nakamura addresses only heat transfer from payload to fixed radiator panels and does not disclose heat transfer from a fixed radiator to a deployable radiator. From our perspective, a combination of Drolen and Nakamura might have suggested providing a thermal control system on Drolen's satellite to alternately thermally couple payload modules to either the fixed radiator disposed on the same side or the fixed radiator on the opposite side of the satellite, for subsequent transfer via flex coils 22 to the deployable radiator(s) adjacent the fixed radiator, depending on the orientation of the satellite, but would not have suggested thermally coupling a fixed radiator to a deployable radiator on the opposite side of the satellite, as called for in appellants' claims. Consequently, the combination of the applied references would not result in the appellants' claimed invention and the rejection must be reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-3 under 35 U.S.C. § 103 is reversed.

REVERSED

CHARLES E. FRANKFORT
Administrative Patent Judge

JOHN P. MCQUADE
Administrative Patent Judge

JENNIFER D. BAHR
Administrative Patent Judge

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